

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

- 1.(Original) A method for encoding a plurality of bits, comprising:
based on a plurality of bits, selecting one of at least two mutually exclusive subsets of a signal constellation and a point within said selected subset; and
modulating the selected point using a carrier waveform,
wherein the selected subset includes at least two constellation points that are separated from one another by a distance based on a conditional distribution.
- 2.(Currently Amended) ~~The method of claim 1~~ A method for encoding a plurality of bits, comprising:
based on a plurality of bits, selecting one of at least two mutually exclusive subsets of a signal constellation and a point within said selected subset; and
modulating the selected point using a carrier waveform,
wherein the selected subset includes at least two constellation points that are separated from one another by wherein the distance based on a conditional distribution is one of a Kullback-Leibler distance and an expected Kullback-Leibler distance.
- 3.(Original) The method of claim 1, wherein selecting a subset of a signal constellation and a point within said selected subset comprises, based on a plurality $m=k_1+k_2$ of bits, using k_1 of the bits to select said subset and k_2 of the bits to select the point within said subset, wherein m , k_1 and k_2 are non-zero integers.
- 4.(Currently Amended) ~~The method of claim 3~~ A method for encoding a plurality of bits, comprising:
based on a plurality of bits, selecting, based on a plurality $m=k_1+k_2$ of bits, using k_1 of the bits to select one of at least two mutually exclusive subsets of a signal constellation and using k_2 of the bits to select a point within said selected subset, wherein m , k_1 and k_2 are non-zero integers; and
modulating the selected point using a carrier waveform,
wherein the selected subset includes at least two constellation points that are separated

from one another by a distance based on a conditional distribution, and

wherein using k_1 of the bits to select said subset comprises encoding the k_1 bits into n encoded bits, and selecting one of 2^n mutually exclusive subsets with the n encoded bits, wherein n is greater than k_1 .

5.(Original) The method of claim 4 wherein $k_2=1$ and $n=k_1+1$.

6.(Original) The method of claim 5 wherein n is selected from the set consisting of three, four and five, wherein the k_1 bits are encoded using a 2/3 convolutional code when $n=3$, the k_1 bits are encoded using a 3/4 convolutional code when $n=4$, and the k_1 bits are encoded using a 4/5 convolutional code when $n=5$.

7.(Currently Amended) The method of claim 1 A method for encoding a plurality of bits, comprising:

based on a plurality of bits, selecting one of at least two mutually exclusive subsets of a signal constellation and a point within said selected subset; and
modulating the selected point using a carrier waveform,
wherein the selected subset includes at least two constellation points that are separated from one another by a distance based on a conditional distribution, and
wherein the constellation points define concentric circles, and every point lying within a circle is from a different subset from every other point lying on that circle.

8.(Original) The method of claim 7 wherein every point on a circle is from a different subset from every other point lying on that circle and from every other point lying on an adjacent circle.

9.(Original) The method of claim 8 wherein $n=3$ and each subset defines two points.

10.(Original) The method of claim 1 further comprising transmitting the carrier, receiving the carrier over a fading channel, and decoding the symbol using a Viterbi algorithm.

11.(Original) A transmitter for transmitting a series of input bits comprising:

an encoder having an input for receiving a plurality of input bits;
a mapper having an input coupled to an output of the encoder; and
a computer-readable storage medium coupled to the mapper for storing at least one signal constellation,

wherein the mapper selects a subset of said signal constellation and a point within the selected subset based on the plurality of input bits, said selected subset including at least two constellation points that are separated from one another by a distance based on a conditional distribution.

12.(Currently Amended) ~~The transmitter of claim 11~~ A transmitter for transmitting a series of input bits comprising:

an encoder having an input for receiving a plurality of input bits;
a mapper having an input coupled to an output of the encoder; and
a computer-readable storage medium coupled to the mapper for storing at least one signal constellation,

wherein the mapper selects a subset of said signal constellation and a point within the selected subset based on the plurality of input bits, said selected subset including at least two constellation points that are separated from one another by wherein the distance based on a conditional distribution is one of a Kullback-Leibler distance and an expected Kullback-Leibler distance.

13.(Original) The transmitter of claim 11, wherein the plurality of input bits comprises $m=k_1+k_2$ of bits, of which k_1 of the bits are used to select said subset and k_2 of the bits are used to select the point within said subset, wherein m , k_1 and k_2 are non-zero integers.

14.(Currently Amended) ~~The transmitter of claim 13~~ A transmitter for transmitting a series of input bits comprising:

an encoder having an input for receiving a plurality of input bits;
a mapper having an input coupled to an output of the encoder for ; and
a computer-readable storage medium coupled to the mapper for storing at least one signal constellation,
wherein the mapper selects a subset of said signal constellation and a point within the selected subset based on the plurality of input bits, said selected subset including at least

two constellation points that are separated from one another by a distance based on a conditional distribution, and

wherein the encoder encodes k_1 of the bits into n encoded bits, and the mapper selects one of 2^n mutually exclusive subsets using the n encoded bits, wherein n is greater than k_1

15.(Original) The transmitter of claim 14 wherein $k_2=1$ and $n=k_1+1$.

16.(Original) The transmitter of claim 15 wherein n is selected from the set consisting of three, four and five, wherein the k_1 bits are encoded using a 2/3 convolutional code when $n=3$, the k_1 bits are encoded using a 3/4 convolutional code when $n=4$, and the k_1 bits are encoded using a 4/5 convolutional code when $n=5$.

17.(Currently Amended)~~The transmitter of claim 14~~ A transmitter for transmitting a series of input bits comprising:

an encoder having an input for receiving a plurality of input bits;
a mapper having an input coupled to an output of the encoder; and
a computer-readable storage medium coupled to the mapper for storing at least one signal constellation,

wherein the mapper selects a subset of said signal constellation and a point within the selected subset based on the plurality of input bits, said selected subset including at least two constellation points that are separated from one another by a distance based on a conditional distribution, and

wherein the constellation points define concentric circles, and every point lying within a circle is from a different subset from every other point lying on that circle.

18.(Original) The transmitter of claim 17 wherein every point on a circle is from a different subset from every other point lying on that circle and from every other point lying on an adjacent circle.

19.(Original) The transmitter of claim 18 wherein $n=3$ and each subset defines two points.

20.(Original) The transmitter of claim 12 further comprising a receiver, said receiver said receiver using a Viterbi algorithm to decode a received symbol into a subset and a point within the subset according to the constellation.

21.(Original) A method for encoding a plurality of $m=k_1+k_2$ input bits comprising:
selecting a subset of a signal constellation based on the k_1 input bits;
selecting a point within the selected subset based on the k_2 input bits, wherein at least two points within the selected subset are spaced from one another by a distance based on a conditional distribution of at least one of said at least two points;
and
modulating the selected point using a carrier waveform,
wherein m , k_1 and k_2 are non-zero integers, and at least one of k_1 and k_2 are greater than one.

22.(Currently Amended) The method of claim 21, A method for encoding a plurality of $m=k_1+k_2$ input bits comprising:
selecting a subset of a signal constellation based on the k_1 input bits;
selecting a point within the selected subset based on the k_2 input bits, wherein at least two points within the selected subset are spaced from one another by a distance based on a conditional distribution of at least one of said at least two points; and
modulating the selected point using a carrier waveform,
wherein m , k_1 and k_2 are non-zero integers, and at least one of k_1 and k_2 are greater than one, and
wherein selecting a subset of a signal constellation based on the k_1 input bits comprises encoding the k_1 input bits into n encoded bits, and selecting one of 2^n subsets using the n encoded bits,
wherein n is an integer greater than k_1 that is derived from the k_1 bits and a previously input plurality of bits.

23.(Original) The method of claim 22, wherein each subset consists of two points and the signal constellation consists of 2^{m+1} points.